

### REMARKS

Claims 1-43 and 45-64 are pending in the application. Claim 45 is amended, claim 44 is canceled, and claims 2-9, 19-37, 42-43, 46-53 and 62-64 are withdrawn from consideration with this response. Reconsideration of the application is respectfully requested in view of the comments below

#### I. AFFIRMATION OF ELECTION OF CLAIMS

Applicants hereby affirm the election of Invention IV, Species I, associated with claims 1, 10-18, 38-41, 44-45 and 54-61. Claims 2-9, 19-37, 42-43, 46-53 and 62-64 are withdrawn from consideration.

#### II. REJECTION OF CLAIM 44 UNDER 35 U.S.C. § 102

Claim 44 was rejected under 35 U.S.C. § 102(b) and 102(e) as being anticipated by U.S. Patent No. 5,036,252 (Löb) and U.S. Patent No. 6,888,146 (Leung), respectively. Claim 44 has been canceled with this response, thereby rendering the above issue moot. Accordingly, withdrawal of the rejection is respectfully requested.

#### III. REJECTION OF CLAIMS 1, 10-11 AND 15 UNDER 35 U.S.C. § 103(a)

Claims 1, 10-11 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Leung, in view of U.S. Published Application No. 2005/0016462 (Yamazaki). Withdrawal of this rejection is respectfully requested for at least the following reasons.

- ***The combination of Leung and Yamazaki is improper because the requisite motivation for such combination does not exist.***

Claim 1 is directed an ion shower, comprising a plasma source within a chamber, an extraction assembly associated with a top portion of the chamber, and a workpiece support structure. The workpiece support structure is also associated with the top

portion of the chamber and is operable to secure the workpiece having an implantation surface oriented facing downward toward the extraction assembly for implantation thereof. Thus the extraction assembly operates to extract ions **out of the chamber** and up **toward the workpiece support structure**. As admitted in the Office Action, Leung does not teach an extraction assembly on a top portion of the chamber as claimed, however, the Office Action asserts that Yamazaki does teach this feature and that one of ordinary skill in the art would have been motivated to combine the teachings of the references to arrive at the claimed invention. Applicants respectfully disagree and submit that no such motivation to combine the teachings of the references exists for at least the following reasons.

It is conceded that prior art references may be combined together if one of ordinary skill in the art would be motivated to do so. Such motivation may be found in the references themselves, in the nature of the problem to be solved, or in the general knowledge of persons of ordinary skill in the art. MPEP § 2143.01. However, such motivation can not be vague or conclusory, but instead must be **clear and particular**. In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999). It is respectfully submitted that upon an evaluation of the cited art as a whole in light of the above standard, the combination clearly is improper due to a lack of motivation for such a combination or modification.

Yamazaki is not directed to an ion implantation apparatus as claimed, but instead teaches a film deposition apparatus, **wherein no formation of ions within the chamber, or extraction of ions from a chamber occurs**. Rather, as illustrated in Fig. 1, for example, a workpiece 10 for film deposition thereon resides within a chamber 11, wherein a feed gas is imported thereto. Organic compounds are also provided therein *via* deposition cells 13. The pressure within the chamber 11 is reduced, and heat is imparted to the organic compound, wherein the sublimation temperature is reached, and the organic compound evaporates and combines with the feed gas to form a film on the workpiece 10 therein. **No ions are formed within the chamber, nor is there any extraction of material (ions or other material) from the chamber**. Clearly then, no

explicit or implicit teaching resides in the references that would motivate one of ordinary skill in the art to modify Leung in accordance with Yamazaki.

In addition, while Yamazaki does discuss orienting the substrate facing downward to suppress dust attachment in paragraph [0066], it is not clear from the reference that the goal of suppression of dust attachment in a **film deposition apparatus** where material is combining in the chamber atmosphere with the intention of deposition onto the substrate would be similar in an ion implantation apparatus, wherein ions are generated in a source chamber and extracted therefrom, since such an apparatus operates in a substantially different fashion. Furthermore, one of ordinary skill in the art, upon evaluating Yamazaki, where the workpiece support structure 12 is located **within** the source chamber, would not have any motivation to **extricate such an apparatus from the chamber** to operate in conjunction with an extraction assembly as claimed, because of the nature of the film deposition process. Therefore one of ordinary skill in the art would not have been motivated to combine Yamazaki with Leung based on the nature of the problem to be solved.

For the reasons highlighted above, the combination of Leung with Yamazaki is improper because insufficient motivation exists for such a combination. Therefore claims 1, 10-11 and 15 are non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

**IV. REJECTION OF CLAIMS 1, 10-13, 15, 45, 54-56 AND 58 UNDER 35 U.S.C.**

**§ 103(a)**

Claims 1, 10-13, 15, 45, 54-56 and 58 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Löb in view of Yamazaki. Withdrawal of this rejection is respectfully requested for at least the following reasons.

- ***The combination of Leung and Yamazaki fails to teach the inventions recited in claims 1 and 45, respectively.***

Claims 1 and 45 are directed an ion shower and a non-mass analyzed ion implantation system, respectively, comprising a plasma source within a chamber, an extraction assembly associated with a ***top portion*** of the chamber, and a workpiece support structure. The workpiece support structure is also associated with the ***top portion of the chamber*** and is operable to secure the workpiece having an implantation surface oriented facing downward toward the extraction assembly for implantation thereof. Thus the extraction assembly operates to extract ions ***out of the chamber*** and up ***toward the workpiece support structure***.

Löb, as illustrated in Figs. 1 and 3 teach an implantation apparatus, wherein ions are generated in a source chamber 1, and extracted therefrom via an extraction assembly 6,7, 8, 9, 10 that is located at a ***bottom portion of the chamber***. Thus Löb does not the above feature, nor does Yamazaki. As highlighted above, ***Yamazaki does not teach or suggest any type of extraction assembly***, rather material formed via sublimation within the chamber is deposited onto a workpiece that resides ***within the chamber***. Therefore a combination of the two references fail to teach the invention. Further, such a combination would be improper because of a lack of the requisite motivation to combine together such references, for similar reasons as those provided above with respect to Leung and Yamazaki. Therefore claims 1 and 45 and their corresponding depending claims are non-obvious over the cited art.

#### **V. REJECTION OF CLAIMS 14 AND 57 UNDER 35 U.S.C. § 103(a)**

Claims 14 and 57 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Löb in view of Yamazaki and U.S. Patent No. 4,987,346 (Katzschner). Withdrawal of this rejection is respectfully requested for at least the following reasons.

- ***Katzschner does not teach or suggest an extraction electrode comprising cooling passages therein, as recited in claims 14 and 57, respectively.***

Claims 14 and 57 each recite that the ***first extraction electrode*** of the extraction assembly ***comprises cooling passages therein***, wherein a cooling fluid flows therethrough to cool the first extraction electrode during extraction of ions from the chamber. The combination of the cited art fails to teach this feature.

The Office Action concedes that neither Löb nor Yamazaki teach a first extraction electrode with cooling passages therein, however, the Office Action asserts that Katzschner teaches this feature. Applicants respectfully disagree. Referring to Fig. 2 of the cited reference, Katzschner teaches extraction electrodes 38, 39 and 40. As illustrated in Fig. 2 and described in Col. 6, lines 50-59, the extraction electrodes are supported by support structures 41, 42 and 43, respectively. These support structures have hollow spaces 44, 45 and 46 associated therewith that receive a cooling agent into the support structures. Therefore Katzschner teach a support structure with cooling passages that is local to an extraction electrode, ***but the cited art does not teach an extraction electrode with cooling passages therein*** as recited in claims 14 and 57. Therefore the combination of cited art does not teach the claimed invention. Thus claims 14 and 57 are non-obvious over the cited art; accordingly withdrawal of the rejection is respectfully requested.

#### **VI. REJECTION OF CLAIMS 16 AND 59 UNDER 35 U.S.C. § 103(a)**

Claims 16 and 59 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Löb in view of Yamazaki and U.S. Patent No. 5,563,418 (Leung). Withdrawal of this rejection is respectfully requested for at least the following reasons.

- ***The combination of cited art is not proper because the combination of Leung with Löb would render Löb unsatisfactory for its intended purpose.***

Claims 16 and 59 recite that the extraction apertures have areas associated therewith, and the areas of the other extraction electrodes downstream of the first extraction electrode are greater than the area of the first extraction electrode. While it is conceded that Leung do teach such a feature in Fig. 1 thereof, Löb teach the opposite type of configuration in Fig. 3 thereof, wherein the second extraction electrode area (electrode 7) is smaller than that of the first electrode 6. Further, as highlighted in Col. 8, lines 25-42, in Löb, ***the second electrode area is purposefully made smaller than that of the first electrode*** in order to produce specific beam focusing characteristics. Further, as highlighted in Col. 8, lines 39-43, making the second electrode area smaller than the first electrode area reduces neutral gas loss and improves the gas economy of the ion source. ***Therefore one or ordinary skill in the art would not have been motivated to modify the teachings of Löb in accordance with Leung, because doing so would render the system of Löb unsatisfactory for its intended purpose.*** MPEP § 2143.01 (V) (*citing In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984) (holding that if a proposed modification would render the prior art being modified unsatisfactory for its intended purpose, then there is no motivation to make the proposed modification).

Therefore the combination of cited art is improper and claims 16 and 59 are non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

## **VII. REJECTION OF CLAIMS 17-18 AND 60-61 UNDER 35 U.S.C. § 103(a)**

Claims 17-18 and 60-61 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Löb in view of Yamazaki and U.S. Patent No. 6,511,577 (Johnson). Withdrawal of this rejection is respectfully requested for at least the following reasons.

- ***Johnson does not teach an extraction electrode comprising interstitial pumping apertures that reduce a pressure near the extraction assembly external to the chamber, as recited in claims 17 and 60, respectively.***

Claims 17 and 60 each recite that one of the other extraction electrodes (not the first extraction electrode) comprises interstitial pumping apertures that reduce a pressure near the extraction assembly external to the chamber. The combination of Löb, Yamazaki and Johnson does not teach this feature. As conceded in the Office Action, neither Löb nor Yamazaki teach an extraction electrode with interstitial pumping apertures as claimed, however, the Office Action asserts that Johnson teach this feature.

Initially, the extraction electrode having ***the interstitial pumping apertures is part of the extraction assembly that is operable to extract ions from the source chamber*** in which the ions are generated, according to claims 17 and 60. ***Johnson does not teach any form of extraction assembly that is operable to extract ions***, rather as illustrated in Fig. 5, a wafer 32 to be implanted resides ***within the chamber*** that includes a plasma source 36 for generating a plasma therein (for etching the wafer 32). An inject/exhaust plate 42 (or plate 80 of Fig. 9) resides in the chamber and is operably coupled to a pump 46 to pump out effluent or waste materials (not ions) out of the source chamber. (See, e.g., Col. 7, lines 56-58). Therefore Johnson does not teach any form of extraction electrode that comprises interstitial pumping apertures as claimed.

Therefore a combination of Johnson with Löb and Yamazaki fail to teach the invention of claims 17-18 and 60-61. Accordingly, withdrawal of the rejection is respectfully requested.

**VIII. REJECTION OF CLAIMS 38-41 UNDER 35 U.S.C. § 103(a)**

Claims 38-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Löb in view of Johnson. Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 38 recites an ion shower comprising an extraction assembly disposed between a plasma source chamber and a workpiece support structure. The extraction assembly comprises a plurality of electrodes that are operable to extract ions from the source chamber. One of the extraction electrodes comprises interstitial pumping apertures. As conceded in the Office Action, Löb does not teach an extraction electrode comprising pumping apertures. As highlighted above, while Johnson does not an inject/exhaust plate having apertures therein, such plate is not part of an extraction assembly operable to extract ions from a chamber. Rather, the plate of Johnson is operable to allow effluent or waste material (not ions) to be pumped out of a source chamber containing a plasma for etching a workpiece therein. Further, one of ordinary skill in the art would not be motivated to modify Johnson to make the plate an extraction electrode because the workpiece 32 resides within the chamber, and thus extracting ions in the plasma out of the chamber would frustrate the intended purpose to use the plasma to etch the workpiece therein. Therefore claims 38-41 are non-obvious over the cited art. Accordingly, withdrawal of the rejection is respectfully requested.

**IX. CONCLUSION**

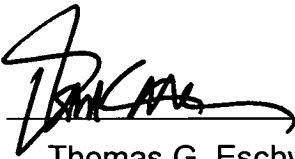
For at least the above reasons, the claims currently under consideration are believed to be in condition for allowance.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.



Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 50-1733, EATNP138US.

Respectfully submitted,  
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Date May 8, 2006

  
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Christine Gillroy